



**Daffodil**  
*International*  
**University**

**Thesis On**

A survey on polypharmacy and practices in Dhamrai, Dhaka, Bangladesh

**Submitted To**

The Department of Pharmacy,  
Faculty of Allied Health Sciences,  
Daffodil International University

In the partial fulfillment of the requirements for the degree of Bachelor of Pharmacy

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December, 2022

## **APPROVAL**

This Thesis A survey on polypharmacy and practices in Dhamrai, Dhaka, Bangladesh, submitted to the Department of Pharmacy, Faculty of Allied Health Sciences, Daffodil International University, has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of Bachelor of Pharmacy and approved as to its style and contents.

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## DECLARATION

I hereby announce that I am carrying out this thesis study under the supervision of Dr. Md. Sarowar Hossain, Associate Professor, Department of Pharmacy, Faculty of Allied Health Sciences, Daffodil International University, Impartial Compliance with the Masters of Pharmacy Degree Requirement (M. Pharm). This project, I declare, is my original work. I also state that neither this thesis nor any part thereof has been submitted for the Bachelors award or any degree elsewhere.

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## Abstract

The term "polypharmacy" describes a patient who is taking many drugs, often an older adult. While taking five or more medications is the definition of polypharmacy that is most often employed. The age group using the most drugs are those over 65; more than 50% of senior people are taking at least one medically inappropriate drug. After the age of 85, polypharmacy decreases in people. Around 150 people physically participated in this poll, which was done. According to this study, 30% of respondents believe that polypharmacy may be brought on by many medical diseases being treated by various subspecialist doctors. 22% of respondents believe that living in a long-term care institution and having persistent mental health disorders may lead to polypharmacy. 18% of respondents believe that the primary cause of polypharmacy is not taking medications as directed. 30% of respondents believe that both A and B are to blame, and 59% believe that polypharmacy is a significant predictor of bad medication responses in both adults and children. According to 33% of respondents, polypharmacy is not a reliable indicator of both adult and pediatric medication responses. 8% of individuals are unaware of this. This research will be useful in related research on polypharmacy.

**Key words:** Nuclear pharmacy, Drug, Diseases, Antibiotic, Polypharmacy

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# Introduction



## 1. Polypharmacy

The growing number of elderly people in the world is one factor that contributes to the growth in the prevalence of polypharmacy. Because older people are more likely to have several chronic illnesses than communities of any other age, they tend to use a greater number of prescriptions than populations of any other age (MCC). The presence of two or more chronic diseases is required for a diagnosis of MCC. Because more than sixty percent of older persons suffer with MCC, it is possible that many drugs for the various forms of MCC will be administered to these patients. Patients may feel burdened in a variety of ways as a result of having to take many drugs. Prescriptions may be rather expensive, and the more medication a patient is given, the higher the total cost will be for them. Another reason why taking numerous drugs may be a hassle is that it can be difficult to keep track of when a person should take each prescription and how frequently they should take each medication. This can make it tough to avoid missing doses. It is more probable that a person is not practicing medication adherence when they take a greater number of medicines. Adherence to medication implies taking drugs in the manner in which they were prescribed. The failure to take medicine as prescribed might have serious repercussions. If a patient does not follow to the specified dosage of their medicine and their condition does not improve or is not controlled, the patient may conclude that the prescribed drug is ineffective when, in reality, the issue is that it is not being taken as directed. Polypharmacy presents a number of challenges, one of which is adherence to prescription regimens; however, adverse effects of medicines also provide challenges. When used simultaneously, some drugs might cause severe and perhaps dangerous adverse effects. Patients who do not get coordinated treatment are at the greatest risk of suffering adverse effects due to the interaction of their medications. The patient's cardiologist may prescribe medicine for the patient's high blood pressure, and the patient's nephrologist may prescribe medication for the patient's kidney condition; these medications are not designed to be used together. It is possible for patients to experience serious negative effects on their health as a direct result of taking medication that is intended to improve their condition even if their treating physicians do not share information with one another and the patients do not inform their doctors about all of the medications they are taking. It is essential for patients to inform their healthcare providers about any and all medicines they are currently taking, whether they were prescribed the drugs or bought them over the counter. Clinical pharmacists are being brought on board by primary care clinicians as one method of providing assistance to the people they serve. Patients who are

looking to enhance their health may benefit from the assistance of a Clinical Pharmacist in determining whether or not there are issues with the pharmaceutical regimen they are currently following.

### **1.1. Pharmacy**

Pharmacy is both the study and practice of drug discovery and development, as well as preparation, distribution, review, and monitoring, with the goal of ensuring that the use of medications is carried out in a manner that is not only secure but also efficient and cost-effective. As a result of its ability to bridge the gap between the domains of medicine and pharmaceuticals and the natural sciences, it has the potential to be categorized as an interdisciplinary field. Because pharmaceutical corporations are responsible for the production of the overwhelming majority of medications, the emphasis of professional practice is gradually changing toward a clinical orientation. There are two primary kinds of pharmacy practices that may be separated from one another based on their locations: community pharmacy and institutional pharmacy. The provision of direct patient care is an essential component of clinical pharmacy, which refers to the practice of pharmacy inside hospitals and other healthcare institutions. [1] The formulation of medications and the distribution of medicines are only two of the more commonplace tasks that fall within the jurisdiction of pharmacists. Examples of more modern healthcare services include clinical services, medication safety and effectiveness evaluations, and the supply of drug information. As a result, pharmacists are the most important members of the medical community since they are the ones who ensure that patients get the most out of their medications and are regarded as the foremost authorities on drug therapy. In the United States, a location where pharmacy is practiced in its first meaning is referred to as a pharmacy. On the other hand, in the United Kingdom, a location where pharmacy is practiced in its first meaning is more commonly referred to as a chemists (even though pharmacy is also used) [citation needed]. Customers in the United States and Canada may often find more than just prescriptions at their local pharmacy. They may also find presents, hair care products, magazines, snacks, toiletries, cleaning supplies, gifts, and even some fresh fruit at their local pharmacy. Before the development of the scientific method, the activity of the apothecary, which involved the exploration of herbal and chemical components, can be seen as a forerunner to the contemporary sciences of chemistry and pharmacology. This is because the apothecary would explore the components of herbs and chemicals.

### **1.1.1. Disciplines**

In general, the field of pharmacy may be broken down into three basic disciplines, which are as follows:

- ✓ Pharmaceutics
- ✓ Pharmacokinetics
- ✓ Chemistry of Medicinal Products and Pharmacognosy
- ✓ The Practice of Pharmacy

The lines that demarcate these areas of study from others in the scientific community, such as biochemistry, are not always easy to distinguish. The development of novel treatments and approaches to patient care often involves the participation of interdisciplinary teams consisting of pharmacists and scientists from other fields working together. Pharmacy, on the other hand, does not fit the traditional profile of a fundamental or biological science. In addition to being a discrete discipline of synthetic chemistry, medicinal chemistry is also a field that combines pharmacology, organic chemistry, and chemical biology. There are many in the pharmacy field that believe pharmacology to be the fourth subject. Although it is fundamental to the study of pharmacy, pharmacology is not an aspect of pharmacy that is exclusive to the field. Both of these spheres of study are separate. Those who are interested in practicing both pharmacy, which focuses on the patient, and pharmacology, which is a branch of biological science that relies on the scientific method, must complete two distinct sets of education and earn two distinct degrees. Another emerging field, pharmacoinformatic aims to facilitate the methodical discovery and development of pharmaceuticals in a way that is both effective and secure. The study of genetically related polymorphisms that influence patient clinical responses, allergic reactions, and the metabolism of medications is referred to as pharmacogenomics.[2]

### **1.1.2. Practice areas**

Community pharmacy, infusion pharmacies, hospitals, clinics, insurance companies, medical communications firms, research centers, pharmaceutical businesses, extended care homes, mental hospitals, and regulatory agencies are just some of the places pharmacists work. Even pharmacists might have specialized knowledge in the medical field.

### **Community pharmacy**

Most pharmacists work in a pharmacy, which may also be called a chemist, drugstore, retail pharmacy, or apothecary depending on the region. Health care providers who also work in retail might be found working in community pharmacies. Retail pharmacies often have a dispensary behind the counter where customers may pick up their prescriptions. Sharif Kaf al-Ghazal claims that Muslim pharmacists in Baghdad opened the first pharmacies in 754. [3]



**Fig 01: Community pharmacy**

### **Hospital pharmacy**

It's important to note that hospital pharmacies are quite different from neighborhood pharmacies. Community pharmacists may deal with more sophisticated commercial and consumer relations difficulties, whereas hospital pharmacists may face more complex clinical drug management issues. Many pharmacists who work in hospitals complete a pharmacy practice residency after pharmacy school, and some even complete a second residency in a more specialized area, due to the complexity of medications, including specific indications, effectiveness of treatment regimens, safety of medications (i.e., drug interactions), and patient compliance issues (in the hospital and at home). Clinical pharmacists are pharmacists who have completed additional training and education in a particular area of pharmacy practice. Many pharmacists choose to focus on a

particular area of medicine, such as hematology/oncology, HIV/AIDS, infectious disease, critical care, emergency medicine, toxicology, nuclear pharmacy, pain management, psychiatry, anti-coagulation clinics, herbal medicine, neurology/epilepsy management, pediatrics, neonatal pharmacy, and more. Most hospitals have their own pharmacies that are conveniently located nearby. A wider variety of pharmaceuticals, including more specialty medications, are often available at hospital pharmacies than in the community. Almost all of the drugs used in hospitals are single-use only. Total parenteral nutrition (TPN) and other IV drugs are among the sterile goods that hospital pharmacists and skilled pharmacy technicians prepare for patients. That's a complicated procedure that calls for well-trained workers, items that have been quality checked, and sufficient space and equipment. A number of hospital pharmacies have begun contracting out their high-risk compounding and other compounding needs to outside organizations. Hospital pharmacies must operate at peak efficiency due to the high cost of pharmaceuticals and drug-related technologies and the potential influence of medications and pharmacy services on patient-care outcomes and patient safety.

### **Clinical pharmacy**

For the benefit of their patients, pharmacists provide a range of direct patient care services that enhance medication efficiency and advance health, wellness, and disease prevention.[4] Although the clinical pharmacy movement started in hospitals and clinics, nowadays you may find clinical pharmacists caring for patients whenever medical attention is provided. Pharmaceutical treatment is enhanced when clinical pharmacists work alongside medical doctors and other medical experts. The role of the clinical pharmacist has evolved to become more multidisciplinary in recent years. When it comes to choosing the right medication for their patients, they often take part in the care round process. After completing a non-medical prescribers training, clinical pharmacists in the United Kingdom may act as Independent Prescribers and prescribe certain pharmaceuticals to NHS and private patients. [5] The clinical pharmacist is responsible for developing an individualized medicine treatment strategy, outlining the therapeutic objectives of the treatment, and examining the patient's prescription regimen before it is dispensed and administered. Medication treatment appropriateness (including drug selection, dosage, route, frequency, and duration of therapy) and effectiveness are common areas of focus throughout the review process. Medication mistakes may be reduced using pharmacist-led interventions, according to the literature. [6] When formulating

and launching a patient's pharmacological treatment, pharmacists must take into account the patient's history of drug responses, drug allergies, and drug interactions. [7]

### **Hospital-based pharmacy for outpatients**

A new and distinct pharmacy practice environment, ambulatory care, has developed with the development of contemporary clinical pharmacy. Pharmacotherapy services offered by a pharmacist at a healthcare facility are the cornerstone of ambulatory care pharmacy. Rather of dispensing medications, pharmacists in this environment typically conduct office visits with patients to help them deal with long-term health problems. Ambulatory care pharmacists in the government healthcare system in the United States (including the Veterans Administration, the Indian Health Service, and the National Institutes of Health) have complete prescription independence. Collaborative prescription and diagnostic power is granted to these pharmacist clinicians in several jurisdictions, including North Carolina and New Mexico. [8] The field of ambulatory care pharmacy practice became eligible for its own board certification in 2011. Pharmacists who are successful in passing the ambulatory care pharmacy specialty certification test will be given the title of "Board Certified Ambulatory Care Pharmacist" and given the letters "BCACP" to denote this distinction. [9]

### **Drug compounding / industrial pharmacy**

The process of compounding entails the preparation of medications in formats other than the conventional prescription norm. Changes might be made to the dose, components, or even the potency. [10] Patients who have trouble taking a prescribed prescription in its regular form, such as those with food allergies or those who have trouble swallowing, may benefit from compounding. These people can still acquire their critical medications thanks to compounding. Preparing medications in non-standard dose forms is one use of compounding. If a medicine is only available in tablet form from the manufacturer, a compounding pharmacist may choose to create a medicated lollipop. The medicated lollipop might be a better option for those who have trouble swallowing the pill. Compounded medications may also be created by combining capsules or tablets of various dosage strengths (g, mg, mcg) to provide the exact dose prescribed by the doctor, PA, NP, or CPP. Community pharmacies, hospitals, and home infusion treatment all use compounding to some degree. Although many compounding pharmacies also distribute the

same non-compounded medications that patients may acquire from community pharmacies, their primary focus is on compounding.

### **Consultant pharmacy**

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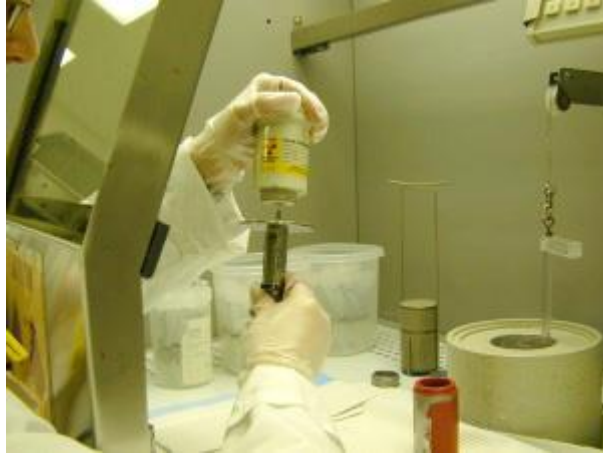
)Medication regimen evaluation (i.e. "cognitive services") is more fundamental to the work of a consultant pharmacist than the actual dispense of pharmaceuticals. Although most consultant pharmacists have traditionally worked in nursing homes, their practice is gradually expanding into a variety of institutional and community-based settings. [11] Many consultant pharmacists in the United States today work for big pharmacy management companies like Omnicare, Kindred Healthcare, or PharMerica, although in the past they were mostly self-employed. It is likely that this trend is beginning to reverse as consultant pharmacists begin to engage directly with patients, mostly due to the fact that many older individuals are now taking many medicines yet are still living in their own homes. In order to meet the needs of their customers, several community pharmacies hire consultant pharmacists and/or provide consulting services. Hepler and Strand propose the primary idea of consultant pharmacy in 1990.[12-13]

### **Veterinary pharmacy**

Veterinary pharmacies, often known as animal pharmacies, may operate as either hospital pharmacies, retail pharmacies, or even mail-order pharmacies. In order to meet the varied pharmacological requirements of animals, veterinary pharmacies carry a wide range of medicine types and dosages. Because animal requirements and veterinary medicine rules might vary widely from human requirements, veterinary pharmacies are sometimes treated as distinct entities.

### **Nuclear pharmacy**

Preparing radioactive materials for use in medical diagnostics and therapy is the primary focus of nuclear pharmacy. Unlike their counterparts in community and hospital pharmacies, nuclear pharmacists seldom if ever engage directly with patients, despite having specialized training in the safe handling of radioactive materials.



**Fig 02: Nuclear pharmacy**

### **Military pharmacy**

This section's examples and viewpoint may not be universally applicable. You may either edit this existing part to make it better, debate the problem on the discussion page, or add a new section to the wiki. (Coming in Late 2019) (Discover when it's OK to delete this template message)On October 7 at Joint Base Balad in Iraq, Airman First Class Breanna DeMasters and Staff Sergeant Giovanni Fiorito of the 332nd Expeditionary Medical Group dispense medicine to patients. Technicians in the military pharmacy conduct tasks such as assessing the appropriateness of medication orders, producing prescription orders, and administering mini-packages of medicine. In civilian pharmacies, this would be against the law since these tasks may only be carried out by a registered pharmacist with the appropriate credentials. [14] State regulations that restrict technicians from advising patients or doing the final drug check before dispensing to patients (instead of a pharmacist entirely responsible for these activities) do not apply in the United States armed forces.

### **Pharmacy informatics**

The field of pharmacy informatics involves the intersection of pharmacy practice science and applied information technology. Informaticians with a pharmacy background may find employment in a wide variety of pharmaceutical specialties, as well as in IT departments and with healthcare IT vendors. Pharmacy informatics is rapidly expanding as a field of study and



specialized field to satisfy the demands of large-scale national and international patient information initiatives and health system interoperability objectives. The pharmacists in this specialty get education and training to assist in the design, implementation, and improvement of systems for managing prescription drugs.[15]

### **Specialty pharmacy**

High-priced drugs for chronic and complicated diseases including cancer, hepatitis, and rheumatoid arthritis are supplied by specialty pharmacies.[16] Specialty pharmacies stock innovative pharmaceuticals that need specific conditions for storage, administration, meticulous monitoring, and clinical management, in contrast to regular drugstores where customers may bring in prescriptions for any generic drug. [17] These pharmacies don't only sell the medications; they also help patients with things like lab monitoring, adherence coaching, and finding ways to cut costs so they can afford the very high prices of their speciality medications. [18] With 19 out of the 28 new pharmaceuticals authorized by the FDA in 2013, the specialty pharmaceutical market is expanding at an unprecedented rate in the United States. [19] The need for physicians who can effectively treat these subsets of patients has led to the development of a new certification test for specialty pharmacists by the Specialty Pharmacy Certification Board. In addition to passing a 100-question computerized multiple-choice test, pharmacists need to have completed 3,000 hours of specialist pharmacy practice over the preceding three years and 30 hours of continuing education for specialty pharmacists within the past two years. [20]

## **1.2.Introduction of Polypharmacy**

The practice of a patient taking many drugs at the same time in an effort to alleviate their symptoms is referred to as polypharmacy (polypragmasia). [21] In most cases, this is referred to as the regular use of five or more drugs; however, the minimum number of medications required for inclusion in other definitions varies. [22-23] Because of the prevalence of chronic illnesses, also known as multimorbidity, patients often need the use of many drugs simultaneously. [24-25] Worryingly, the probability of a patient experiencing an adverse event increases when they take an excessive number of medications. This is especially true for senior persons who have many chronic health concerns. [26-27] Estimates of the prevalence of polypharmacy vary from ten percent to ninety percent, depending on the terminology that is used, the age group that is investigated, and the

location of the research.[28] The aging of the world's population is contributing to the growing importance of polypharmacy. The percentage of the world's population that is aged 65 or older is quickly increasing in a number of different countries. [29-31] The aging of the baby boomer generation as well as the increased average life expectancy due to breakthroughs in medical care around the world are to blame for this growth. These factors have contributed to an increase in the global population. [32] Twenty one percent of those who have intellectual impairments are also vulnerable to the dangers posed by polypharmacy. [33] According to the findings of a recent analysis of the data that was made public, more than one-third of patients aged 65 and older took five or more different medications between the years 1999 and 2012. [34] Taking many drugs at once may have unforeseen repercussions, diminish the effectiveness of treatment, or even be counterproductive in and of itself, but this is not always the case. The professionals who offer medical treatment believe that this is the kind of scenario that need careful monitoring as well as frequent medication evaluations to verify that all of the medications that were given are still necessary. When it comes to polypharmacy, there are several reasons to be concerned. These include a higher chance of bad pharmaceutical reactions, drug interactions, the "prescribing cascade," and greater healthcare expenditures. [35] A patient is given a pharmaceutical, and then later has a bad side effect that is mistaken as a new medical concern, which then leads to the administration of yet another medication. This is an example of a prescription cascade. [36] It's possible that taking many medications can reduce your quality of life by limiting your movement and your mental ability.[37] A patient factor that impacts the quantity of pharmaceuticals that are advised to a patient is the presence of a significant number of chronic illnesses that need an intricate treatment regimen. The fact that a patient may have several prescribers and pharmacies, some of which may not interact with one another, contributes to the complexity of the healthcare system and raises the risk that a patient may be prescribed an excessive number of medications. When compared to the effects of taking just one medication at a time, known as monotherapy, the advantages of polypharmacy, in each specific instance, could or might not outweigh the risks involved. The use of many drugs does not always point to insufficient treatment or excessive dosing, particularly when the disorders being treated are relatively straightforward. Furthermore, it is common knowledge in the field of pharmacology that without conducting research on a particular medication combination in test subjects, it is difficult to reliably anticipate the adverse effects or clinical consequences of that combination. This is because it is impossible to know which

medications will interact with each other in a test subject's body. Because of the pharmacokinetics that are specific to each individual's genome, the effects can differ from person to person. Even if one is familiar with the pharmacologic profiles of the individual medications at issue, this does not guarantee that one can accurately predict the adverse effects of a combination of those drugs. Determining whether or not to decrease a patient's prescription list (also known as deprescribe) can be a challenging task because the attending physician needs to weigh the advantages and disadvantages of continuing to prescribe the drug against the advantages and disadvantages of terminating treatment. Regrettably, obstacles such as care transitions that are poorly handled (poor continuity of care, often as a result of walled information), busy physicians, and interventionism prohibit a full and wise review from taking place.[38]

### **1.2.1. Appropriate medical uses**

There are circumstances in which the practice of prescribing many pharmaceuticals is not only justifiable but even medically helpful. Despite the fact that the practice is frequently frowned upon, there are scenarios in which it is. The practice of prescribing for patients who have several or difficult diseases in such a way that the use of all drugs necessary to treat those disorders is prioritized and is supported by the present level of knowledge is referred to as "appropriate polypharmacy." Clinical polypharmacy is appropriate for the treatment of certain chronic conditions, such as diabetes mellitus; nevertheless, it should be discontinued when the advantages of ongoing therapy are no longer sufficient to outweigh the hazards. [39] Synergistic interactions are responsible, at least in part, for the enhanced therapeutic effects that may be achieved by using certain medications in conjunction with one another. In the medical fields of anesthesia and pain treatment, typical analgesics such as opioids, prostaglandin inhibitors, nonsteroidal anti-inflammatory drugs (NSAIDs), and others are frequently combined with atypical medicines such as antiepileptics, antidepressants, muscle relaxants, and NMDA antagonists. This approach of treating pain has an impact that reduces the need for analgesic medication.[40]

#### Examples

- ✓ In the first year after a myocardial infarction, a suitable treatment plan may include an antidepressant, aspirin, an ACE inhibitor, a beta-blocker, a statin, and a paracetamol combination. It might also include an ACE inhibitor.[41]

- ✓ Anesthesia, particularly intravenous anesthesia and general anesthesia, almost always requires the use of multiple agents. These agents can include hypnotics or analgesic inducing/maintenance agents like midazolam or propofol, typically an opioid analgesic like morphine or fentanyl, typically a paralytic like vecuronium, and in inhaled general anesthesia, generally a halogenated ether anesthetic like sevoflurane [42]

### **1.2.2. Particular groups**

Those who are elderly, those who have psychiatric conditions, patients with intellectual or developmental disabilities, those who are taking five or more drugs at once, those who have multiple physicians and pharmacies, those who have recently been hospitalized, those who have concurrent comorbidities, those who live in rural communities, those who do not have adequate access to education, and those who have limited financial resources are all at an increased risk for negative polypharmacy outcomes. Polypharmacy is more widespread in younger age groups, and it is possible that underprivileged areas have a higher incidence rate of the practice. [43] Abusing many medications at once is a common tendency among those who are dependent on or addicted to multiple substances.[44] Approximately 84% of those who take prescription medications are also abusing other drugs.However, it is important to be aware that even when the term "polypharmacy" is used in a critical or pejorative manner, the term and its derivatives often refer to the legal use of medications as prescribed.It's possible that actions will be done in order to reduce the overall number of drugs required. The term for this emerging field of research is "deprescribing." [45] It has been shown that decreasing the overall number of medications used may improve health outcomes in a way that is both risk-free and productive, without resulting in any obvious adverse consequences. [46] Clinical pharmacists may work in collaboration with physicians and patients to detect and address polypharmacy difficulties, as well as to perform drug treatment reviews and educate both parties on the dangers and advantages of taking a large number of drugs. It is possible for the effects of polypharmacy, such as adverse medication events, non-adherence to medication regimens, hospital admissions, drug-drug interactions, geriatric syndromes, and mortality, to be minimized by therapies of a similar kind. [47] Since it is possible for some prescription medications to mix with over-the-counter medications or herbal remedies, it is essential for patients and their doctors to inform their pharmacists about any prescription medications they are currently taking. The viewpoints and attitudes about polypharmacy held by

workers in long-term care institutions are quite diverse. Some of these perspectives and attitudes may result in an increased consumption of pharmaceuticals than is strictly required. [48]

### **1.2.3. Risks of polypharmacy**

Even while there is some data to show that the risk of polypharmacy falls somewhat beyond the age of 90, it is still abundantly obvious that the risk increases with age. Poor health is a key predictor of polypharmacy at any age; however, it is unknown whether polypharmacy causes ill health or whether it is used as a consequence of bad health. What is known is that poor health is a strong predictor of polypharmacy. A person's age group is a factor that might influence the factors linked with polypharmacy. When many medications are taken at the same time, there is a greater chance that one or more of the medications won't work well. In the pharmaceutical industry, it is customary to characterize potentially inappropriate medications as those that have been determined to be ineffective by a group of experts, such as the Beers Criteria. This definition is used rather often. Because the risks associated with taking these medications are greater than the benefits they provide, people over the age of 65 are not often given a prescription for them. Urinary anticholinergics are one example of these kinds of drugs, and they have the potential to prevent an average of one episode of incontinence per 48 hours. However, they are also associated with an increased risk of falling, as well as constipation, dry eyes and mouth, and impaired cognitive function. The senior population that resides in long-term care institutions has a number of challenges, including polypharmacy, the under-prescribing of potentially indicated therapies, and the use of high-risk medications. [49] When a person is taking many drugs, their risk of falling rises, especially if they are an older adult.[50-51] It is well known that the risk of falling while taking certain medications, in particular those prescribed for the treatment of mental illness and cardiovascular disease, may be increased. [52-53] According to the findings of several studies, a person's risk of falling increases in proportion to the quantity of medicines they use. [54-55] Stopping the use of any drugs that are known to make people more clumsy is one way to significantly reduce the risk of falling in the future. When taking any kind of medication, there is always a chance that unpleasant side effects can occur. The use of many medicines is associated with an increased risk of experiencing negative effects in one's life. In addition, there are interactions that may occur between certain medications and other substances, including foods, vitamins, and even different types of medicines. [56] There is a risk of a major drug interaction

occurring once per fifteen elderly patients. [57] Older people are at a larger risk for a drug-drug interaction than younger people because of the growing number of medications that are prescribed to them and the changes in their metabolism that come with advancing age. When a new drug is used, the risk of experiencing negative effects drastically increases. It is the objective of both prescribers and pharmacists to minimize adverse interactions between pharmaceutical drugs, and as a result, dose adjustments are often required. Because it interacts with a number of medications and dietary supplements, including warfarin, its efficiency may be diminished. [58]

### **Drug Weight**

The term "pill burden" refers to the amount of time and effort that is required to keep track of and manage one's prescription routine, including the quantity of pills (tablets or capsules, the most common dose forms) that are taken on a daily basis. This can be a significant burden for individuals who take multiple medications. The use of particular medications is rising at a faster pace than the volume of pills being consumed. [59] According to the findings of a recent study, elderly people living in long-term care institutions consume between 14 and 15 tablets every day, on average. [60] People who are prone to using many medications and who take a high number of pills on a daily basis often have trouble adhering to their medical regimen.[61] As a consequence of this, the likelihood of adverse reactions to drugs and interactions between medications increases. There is evidence to suggest that taking a significant number of pills on a daily basis increases the risk of experiencing a medical complication, makes it more likely that patients will make mistakes while taking their medications, and drives up the price of both the drugs themselves and the care they provide for patients who experience side effects. Finally, a significant number of patients are upset because they are required to take an excessive amount of medication. When looking at patient demographics, it is important to note that people who use antiretroviral medications to treat HIV are not the only patients who have a high pill load; other patient groups do as well.[62] Patients who have more than one chronic condition, such as those with diabetes, hypertension, lymphedema, hypercholesterolemia, osteoporosis, chronic constipation, inflammatory bowel disease, and clinical depression, may be required to take as many as a dozen different medications on a daily basis. This is because treating multiple chronic conditions can have a cumulative effect on a patient's overall health. [63] The use of many drugs at the same time has been associated to an increased risk of adverse drug events [64] It is possible to improve patients' adherence to their

treatment plans by reducing the quantity of medications they are required to take on a daily basis. The practice of evaluating the possible negative effects of a drug against the benefits it offers is one approach to achieving this goal. This approach is referred to as "deprescribing." Drugs that are used to treat osteoporosis, such as bisphosphonates, fall into this category since they are often taken forever, despite the fact that there is only evidence to support their usage for a period of five to 10 years. [65] Patient education programs, reminder messages, the packaging of medicines, and the use of memory tricks have all contributed to increases in adherence as well as reductions in the burden of taking several medications. This has been seen in a number of different countries. Adherence to medication can be improved in a variety of ways, such as by associating medication consumption with particular meals, writing the dosage instructions directly on the packaging, storing the medication in a visible location (such as the kitchen counter or the living room), and displaying the prescription sheet in an easily accessible location (like the fridge). The development of mobile applications has also proven helpful in this domain. It has been shown that polypill regimens, such as the combination pill for HIV medication, are equally as effective as multipill regimens in reducing the overall number of pills taken and improving adherence. [66] Using active components with a longer duration of action as opposed to those with a shorter duration of action has the potential to lessen the overall pill load. Angiotensin-converting enzyme (ACE) inhibitors are a kind of medication that is often used to treat hypertension. It is important that you provide a medical reference. Two of the most prevalent ACE inhibitors are called lisinopril and captopril. While it is possible to take captopril three times each day, lisinopril only has to be taken once. Lisinopril might be an option for you to explore replacing captopril with if there are no drug interactions or other difficulties that could arise from the change. This could help you lower the amount of medications that you have to take on a daily basis.[67]

#### **1.2.4. Interventions**

Deprescribing is the most common technique for dealing with patients who have issues related to polypharmacy. Medication simplification, on the other hand, isn't seeking to cut down on the overall number of drugs but rather on the various dosages and administration schedules, and this might potentially lead to misunderstanding with deprescribing [68-69] It does not seem that the method by which prescriptions are entered into a computer or written by hand has any impact on the frequency or quantity with which patients take their drugs. [70] Deprescribing is the process

of reducing a patient's medication load by recognizing when an individual's health advantages are no longer being achieved and then terminating the prescription in question. This is done by determining when an individual's medication is no longer beneficial to their health. [71] As the patient's condition worsens, the focus of treatment shifts from being curative to being palliative; as a result, this phenomenon is most widespread among the elderly. In residential care homes, communities, and hospitals, it has been shown that deprescribing is beneficial and may be done in a practical manner. In the event that (1) a new symptom or adverse event presents itself, (2) the individual develops an illness that has reached its terminal stage, (3) the combination of medications poses a risk, or (4) discontinuing the drug does not alter the progression of the disease, then this preventive step should be considered. [72] There is a wide variety of information at the physicians' disposal to aid them in determining when it is secure to cease prescription medicine and which medications may be safely introduced. By using the Beers Criteria and the STOPP/START criteria, respectively, it is possible to determine which medications have the highest risk of adverse drug events (ADE) and of interactions between different medications. [57] The Prescription appropriateness tool for comorbid health conditions during dementia (MATCH-D) is the first instrument devised specifically for persons who have dementia. It issues a warning against polypharmacy and complex prescription regimens. [73-74] The implementation of deprescribing strategies has been challenging because to the barriers that have been experienced by both patients and medical professionals. [75] The fear of deprescribing repercussions, prescriber trust in deprescribing abilities, reluctance to change prescriptions given by specialists, deprescribing feasibility, lack of access to all clinical records, and the difficulty of having many providers are just a few of these issues. Other issues include: the inability to have many providers. [76-78] Obstacles for patients who are given or require the prescription include attitudes or beliefs about the medications, challenges in communicating with physicians, concerns about deprescribing, and the influence of doctors, family, and the media. It's possible that other members of the medical staff or caretakers, such as those working in assisted living, may claim that the prescriptions are essential. It is still uncertain whether or not pharmacological treatment and computerized decision support are effective in the process of minimizing improper polypharmacy usage. This is due to the fact that the quality of the evidence that is now available for these treatments is low, as mentioned by the authors themselves [79] High-quality research is necessary in order to arrive at any definitive findings on the efficacy of such therapies in nursing homes. [80]



Deprescribing rounds have been proposed as a potentially useful method for reducing polypharmacy rates. [81] In order to help facilitate the practice of deprescribing, there may be a need for improved communication between all practitioners involved in patient care, increased pay for time spent deprescribing, explicit deprescribing criteria, and the sharing of positive results from doctors who have used deprescribing. In spite of the difficulties, participants in a recent blinded experiment of deprescribing took, on average, two less medicines after 12 months, which demonstrates once again that deprescribing is really achievable. [82]

### **1.2.5. Consequences of polypharmacy**

There is a considerable body of data that connects polypharmacy to concerns over the safety of medications. The PRACTICE (PREvalence And Causes of prescribing mistakes in general practice) investigation of prescription errors in UK general practice, which was commissioned by the General Medical Council, did not take into consideration whether or not the medication being prescribed was suitable for the patient. One in every eight patients were negatively impacted by prescribing or monitoring errors, which happened in 5% of all prescription products. People who were using 10 long-term medications had a risk that was three times as high as those who were on just one or two medications.[83] One in every 13 patients will suffer a medication interaction, and one in every 200 patients will experience four or more drug interactions. Patients who take ten or more medications have more than two times the risk of experiencing a potentially lethal interaction between those medications. Moriarty and colleagues discovered that taking five or more medicines on a regular basis was connected with a roughly 7-fold increase in the odds of probably incorrect prescribing. However, the risk presented by polypharmacy has significantly decreased over time. There is a correlation between increased use of medical care and polypharmacy, which may be evaluated by tallying the total number of drugs taken. It has been shown that the use of many medications at the same time is the leading cause of adverse pharmaceutical reactions, which are responsible for 6.5% of all hospital admissions.[84-85] There are other models that may predict trips to the emergency department, and some of them take into account the patients' multiple medications. It is essential to keep in mind, on the other hand, that the considerable connection that exists between polypharmacy and morbidity is a primary component that contributes to the latter association. Payne et al. carried out an observational study and found that the strongest association between polypharmacy and admission was dramatically diminished among the

individuals who suffered from the greatest number of comorbidities. This finding is consistent with the concept of therapeutic benefit. [86] This highlights the need of differentiating healthy types of polypharmacy from dangerous varieties of the practice once again. Despite the fact that the therapeutic benefits of pharmacotherapy are often obvious, it is essential to take into consideration any possible downsides that may develop in addition to those that are solely related to safety. Patients who are given a large number of medications have been found in more than one study to have a lower rate of medication adherence, which may result in a reduction in the efficacy of the treatments they are receiving. [87] The perception that a patient is receiving an excessive amount of medicine is also associated with a worse overall health-related quality of life<sup>28</sup>, which may further diminish the therapeutic efficacy of the drug. In light of the potential adverse effects that may be brought on by problematic polypharmacy, it is vital to briefly examine relevant medication optimization methodologies. Doing so, however, is beyond the scope of what is being covered in this study. A recent Cochrane review that attempted to prevent unnecessary polypharmacy in the elderly discovered a total of twelve different techniques to accomplish this goal. The great majority of these interventions consisted of numerous separate pharmacy services being provided at various points of the therapy process. The intervention consisted of a variety of different components, including medication reviews, patient education, education for healthcare providers, medication adherence aids, and multidisciplinary case conferences. There was a shortage of research conducted that was of a high quality, and the majority of the study that was conducted focused on reducing the overall number of pharmaceuticals given rather than enhancing the accuracy of prescriptions.[88]

# Literature review

**Robert L Maher, Joseph Hanlon & Emily R Hajjar “Clinical consequences of polypharmacy in elderly” Expert Opinion on Drug Safety Volume 13, 2014 - Issue 1**

Polypharmacy, which is defined as the use of many pharmaceuticals or more than is medically required, is an increasing problem among senior citizens. According to international studies, polypharmacy is prevalent among older persons, with nursing home residents taking the most medications. Nearly half of elderly persons use at least one non-medically essential medicine. Research has conclusively demonstrated a substantial association between polypharmacy and adverse clinical outcomes. In addition, well-designed interprofessional (often including clinical pharmacist) intervention studies focusing on enrolling high-risk older patients with polypharmacy have demonstrated that they can be effective in reducing aspects of unnecessary prescribing, albeit with variable effects on distal health outcomes.

**LJG Veehof, RE Stewart, FM Haaijer-Ruskamp, B Meyboom-de Jong “The development of polypharmacy. A longitudinal study” Family Practice, Volume 17, Issue 3, June 2000**

Although polypharmacy is regarded one of the major areas that physicians must be aware of, few research have investigated its growth over time. Those who have examined the scope of polypharmacy throughout time have seen a rise. Insofar as the evolution of drug use over time is concerned, however, these studies are of limited use due to their reliance on a restricted number of time measures. More recent research indicated that fifty percent of the elderly on three or more medications began further therapy after two years, reinforcing the evidence of polypharmacy's rise over time. However, the research revealed few information about the causes causing the rise in polypharmacy. There is no information on the disorders that contribute to the rise in polypharmacy. Longitudinal studies may offer such information and may provide hints on potential (or necessary) treatments. Regarding the emergence of polypharmacy, deterioration in health status (growth in the number of illnesses and deterioration of diseases) has been characterized as significant.

**D.A. Gorard “Escalating polypharmacy” QJM: An International Journal of Medicine, Volume 99, Issue 11.**

The emergence of polypharmacy is influenced by a number of variables, including novel medication therapies, updated indications for traditional therapies, lowered thresholds for addressing risk factors in preventive medicine, and an aging population with numerous diseases. Studies conducted throughout time show that prescription drug use has increased, especially among the elderly. The risks of negative medication interactions and reactions, poor adherence, and confusion brought on by rising polypharmacy are expected to become worse. The risks associated with polypharmacy will undoubtedly diminish when prescription practices are reduced. These include external assessments of medication lists by a doctor or pharmacist and more careful prescribing when thinking about adding to patients' already extensive prescription lists. Despite such tactics, polypharmacy appears unavoidable, therefore single-daily dosing regimens, fixed-dose combination pills, calendar-blister packaging, and pill organizers must all be taken into account when trying to make patients' numerous medicine administrations simpler.

**Jonas W. Wastesson ORCID Icon, Lucas Morin, Edwin C.K. Tan & Kristina Johnell “An update on the clinical consequences of polypharmacy in older adults: a narrative review” Expert Opinion on Drug Safety Volume 17, 2018 - Issue 12.**

Age-related polypharmacy, or the use of many drugs by one person, is becoming more widespread. In the next years, providing care for the expanding population of elderly individuals who have multimorbidities and complicated medication regimens will be a significant problem. Around the globe, there are more and more senior citizens. As more individuals have the chance to live long lives, many will also go through a stage of life when many health issues coexist. For the foreseeable future, the health-care system will continue to face difficulties due to the rising number of multimorbid older persons who need complicated medication regimens.

The use of several drugs by one person, or polypharmacy, might be a sensible solution to addressing older persons' complicated health issues. A increasing worry is that many elderly people are taking an excessively large number of drugs.

# Aim of the study

## Survey on Polypharmacy

My aim of this study is given bellow

- a) To learn what attitudes individuals have about polypharmacy
- b) To determine how individuals interact with their medications
- c) Which medication class is most often used in polypharmacy
- d) To see that how many people know about polypharmacy is a strong predictor of adverse drug reactions in both adults and children
- e) To see why older people are more likely to have trouble with polypharmacy

# Methodology



#### **4.1. Introduction:**

31 questions that are relevant to the topic at hand are asked after a review in the questionnaire. In all, 150 patients were a participant in this study. This study was carried out in Natore, Khulna, and Dhaka.

#### **4.2. Research Design:**

This study was conducted to determine people's thoughts on polypharmacy as well as its effects on their lives. The study was carried out in Dhaka, Khulna, and Natore. It was cross-sectional study that relied only on the bodily reactions of participants. Microsoft Word was used to compose the questions.

#### **4.3. Method of Data Analysis:**

After an assortment of information, all information was checked for precision and internal consistency to deny missing or clashing data, and those were discarded. Information investigation was done through Microsoft's dominant refreshed rendition.

#### **4.4. Ethical Considerations**

Before beginning the information assortment, educated verbal permission was taken from the investigation members. The obscurity of the respondents was kept private, and study subjects were educated that they could have the option to leave the program at any.

**Survey Question:**

A survey on present conditions of polypharmacy in Dhaka, Khulna and Natore

1. Name...?
2. Age?
3. Location...?
4. How many drug taken at a time?.....
5. Do you think self-medication can cause polypharmacy?
  - a) Yes
  - b) No
  - c) Don't know
6. Have you had any medication interactions?
  - a) Yes
  - b) No
  - c) Don't know
7. Are you or your family member take medicine according to prescription ?
  - a) Yes but missed sometime
  - b) Yes
  - c)No
8. which class of drug do you take most?
  - a)Anti-ulcer
  - b)NSAID
  - c)Anti Histamin

d)Other.....

9.Do you think Polypharmacy is associated with increases in many adverse outcomes like adverse drug reactions, drug to drug interactions, drug to disease interactions, non- adherence, falls, cognitive impairment,

a)yes

b)no idea

c)no

10.Do you know polypharmacy is a strong predictor of adverse drug reactions in both adults and pediatric?

a)yes

b)no

c) don't know

11.Do you know Polypharmacy creates challenges for patients to adhere to a medication regimen of : Complex dosing schedule , Medication instruction confusion , Side effects , Reactions , High cost,Fill and refill frequency ?

a)yes

b)no

c)don't know

12.Which is the approaches to reducing polypharmacy?

a)Maintain an accurate medication and medical history

b)Link each prescribed medication to a disease state

## Survey on Polypharmacy

- c) Identify medications that are treating side effects
- d) Reconcile medications upon discharge from hospital or skilled nursing facility
- e) Taking prevention during prescription
- f) yes
- g) no idea

13. DO you know about the risk of DDI of polypharmacy in patients with chronic kidney disease (CKD), Liver disease and HIV patient ?

- a) yes
- b) no
- c) don't know

14. Which is the best example of polypharmacy?

- a) Your patient is filling her medications at more than 1 drugstore.
- b) Your patient is taking more than 2 medications.
- c) Your patient is taking more than 9 medications.
- d) Your patient is taking a potentially inappropriate combination of medicines.

15. Why are older adults more at risk of problems with polypharmacy?

- a) Older adults like taking lots of medicines.
- b) Older adults are less likely to see a physician.
- c) Older adults are more likely to have comorbidities requiring pharmacologic intervention.
- d) None of the above

16. Which is the most effective method of managing polypharmacy?

- a) Use a —brown-bag review of medications at each office visit, to ensure an accurate med list.

b)Limit your patients' medication list to no more than 4 medicines. c)Regularly assess patient adherence to the medication regimen.

17.What increases the risk of polypharmacy?

a)having multiple medical conditions managed by multiple subspecialist physicians

b)having chronic mental health conditions, and residing in a long-term care facility.

c)Take medicine according to prescription

d)A & B

18.What factors contribute to polypharmacy in the elderly? a)Frailty

b)multimorbidity

c)obesity, and decreased physical as well as mental health status d)All

19.Taking more than five medications is called polypharmacy

a)True

b)False

20.Is this medication harmful?

a)Yes

b)No

21.Do the side effects outweigh the potential benefits?

a)Yes

b)No

c)May be

22. Do you know about any drug-drug or drug-disease interactions ?

a) Yes

b) No

23. Do you have any idea about over-the-counter drugs, supplements or herbal medications?

a) Yes

b) No

24. Is this drug being used to treat the side effects of another drug?

a) Yes

b) No

25. Do you know about the possible symptoms of polypharmacy include:

a) Loss of appetite. b) Falls. c) Confusion. d) Weakness. e) Tremors.

f) Don't know

26. What are the risks of polypharmacy?

a) Falls and cognitive impairment    b) Harmful drug interactions

c) Drug-disease interactions    d) No idea

27. How does polypharmacy occur?

a) Self-medicating without an accurate understanding of effects and reactions

b) No idea

28. How do you test for polypharmacy?

a) Ask the patient if they feel they are taking too many medicines

b) Don't know

29. Do you know how is polypharmacy treated?

## Survey on Polypharmacy

a) Yes b)No

30. What is the best example of polypharmacy?

a) when a person is taking many different medications at the same time

b) No idea

31. Characteristics of polypharmacy is a large number of medications ,Use of potentially inappropriate medications , Medication underuse and duplication,

a) Yes

b) No

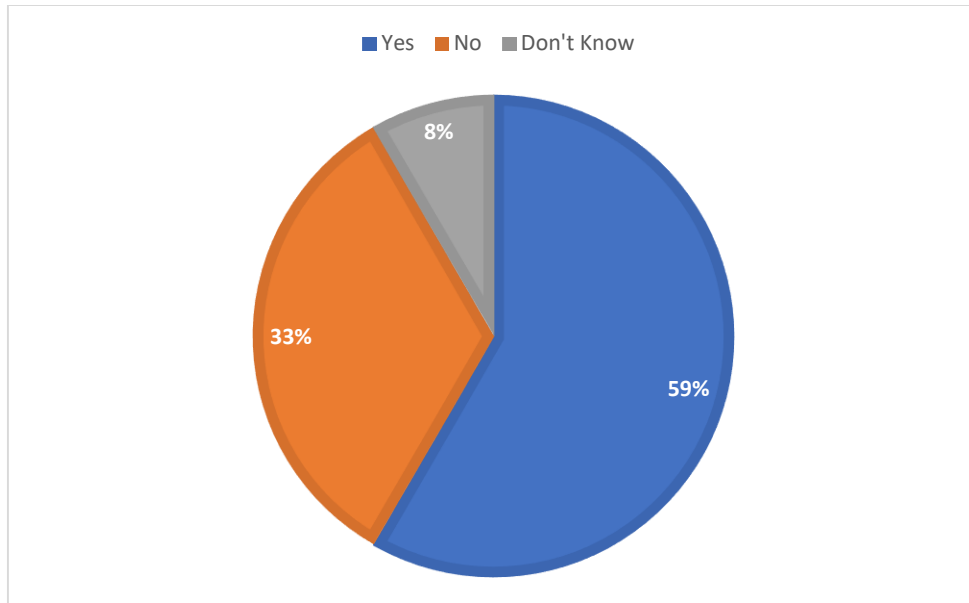
c) No idea

d) Maybe

# Result & Discussion



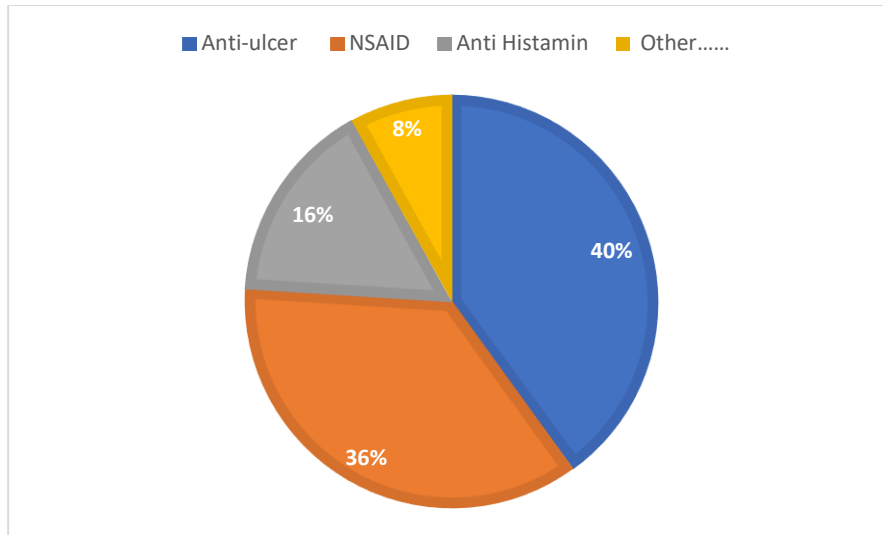
### 5.1. Knowledge about polypharmacy



**Fig 03: Knowledge**

In this survey, 55% people know that self-medication can cause polypharmacy. 36% people think that that self-medication cannot cause polypharmacy. 9% people have no idea about this.

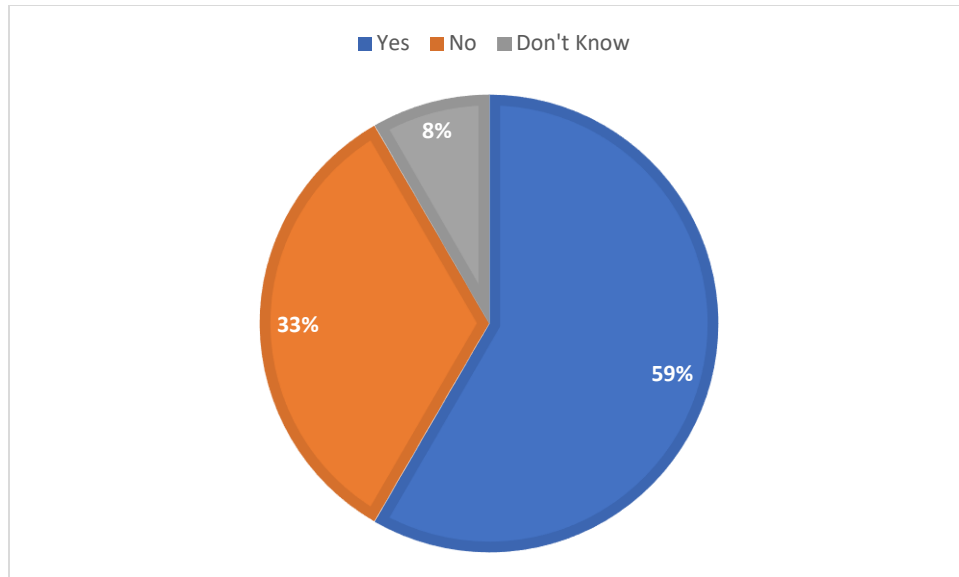
## 5.2. Most used Drug



**Fig 04: Drug**

According to this survey, 36% people take NSAID drug. 40% people take Anti-ulcer drug. 16% people take anti Histamin drug. 8% people take others drug.

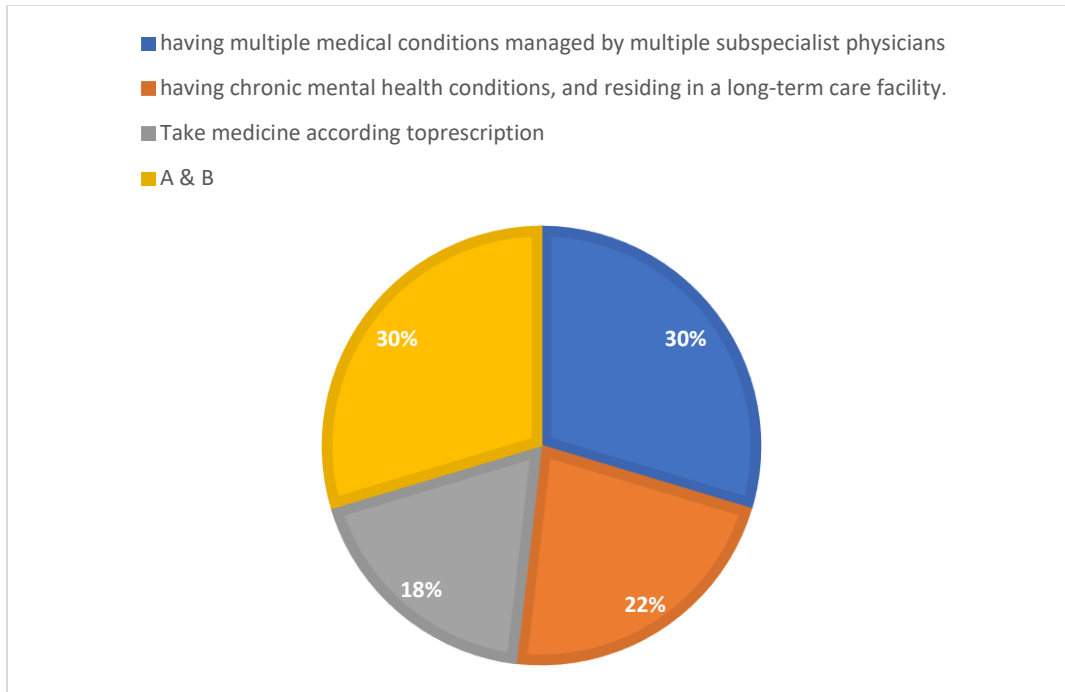
### 5.3. Adverse drug reaction



**Fig 05: Adverse drug reaction**

According to this survey, 59% people think polypharmacy is a strong predictor of adverse drug reactions in both adults and pediatric. 33% people think polypharmacy is not a strong predictor of adverse drug reactions in both adults and pediatric. 8% people have no idea about this.

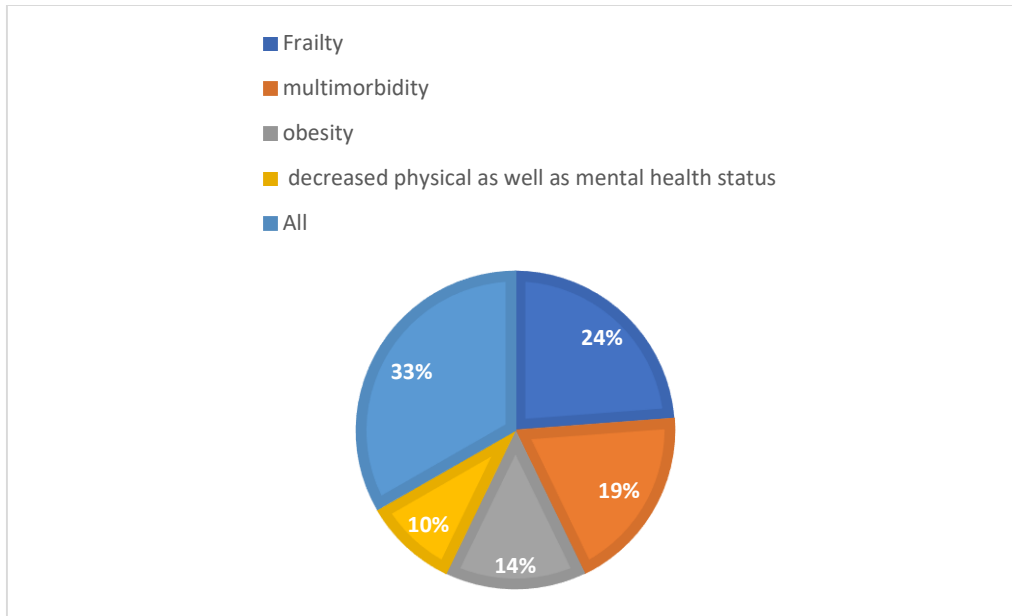
### 5.4. Risk Of Polypharmacy



**Fig 06:Risk of Polypharmacy**

In this survey, 30% of people think having multiple medical conditions managed by multiple subspecialist physicians can cause polypharmacy. 22% of people think having chronic mental health conditions, and residing in a long-term care facility can cause polypharmacy. 18% of people think not taking medicine according to prescription is the main cause of polypharmacy. 30% of people think both A & B is the cause.

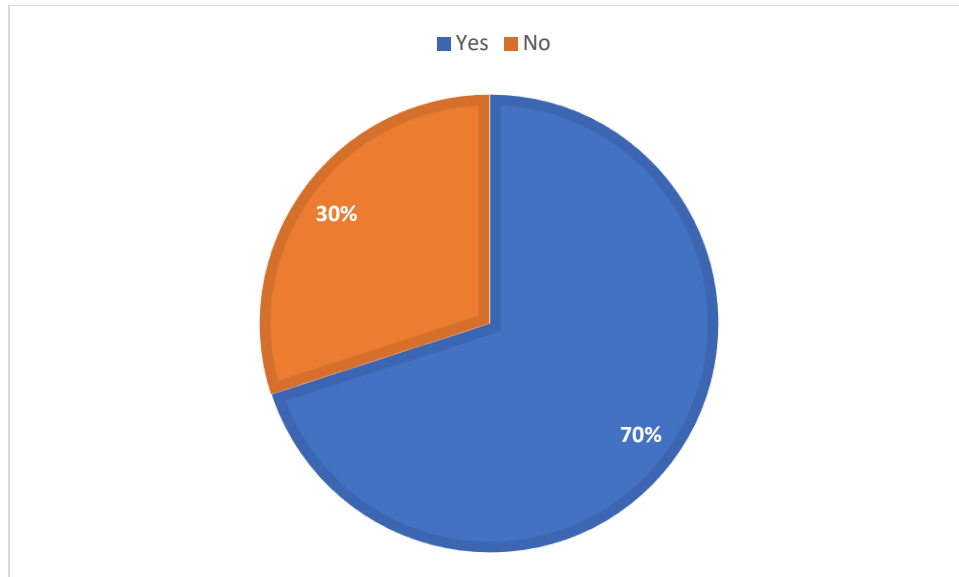
### 5.5.Factor



**Fig 07: Factor**

In this survey, 24% people Frailty is the factor of polypharmacy. 19% people think multimorbidity is the factor of polypharmacy. Obesity is the factor of polypharmacy 14% people think it. 33% people all of them is the factor of polypharmacy.

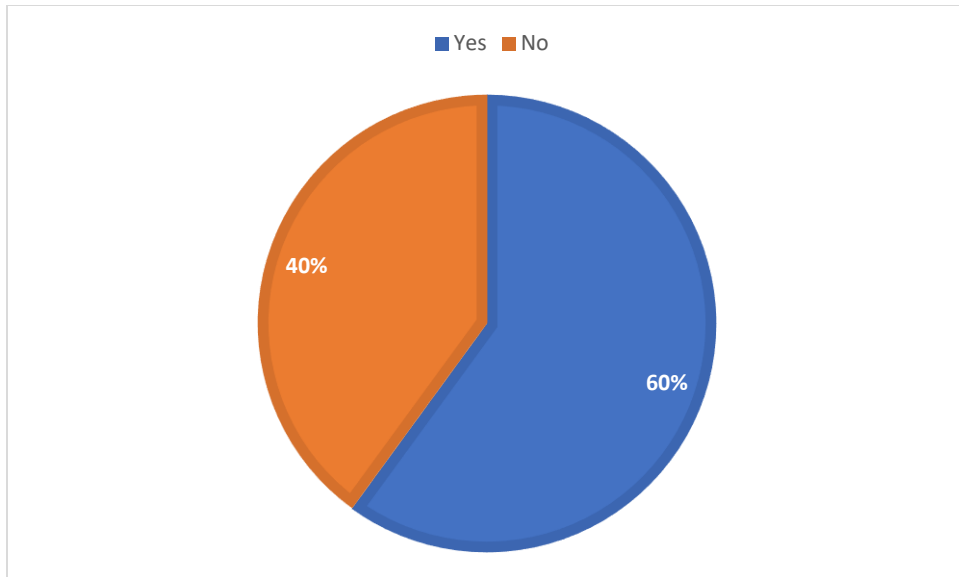
## 5.6. Polypharmacy



**Fig 08: Polypharmacy**

According to this survey, 70% people think taking more than five medication can cause polypharmacy. 30% people think it does not cause polypharmacy.

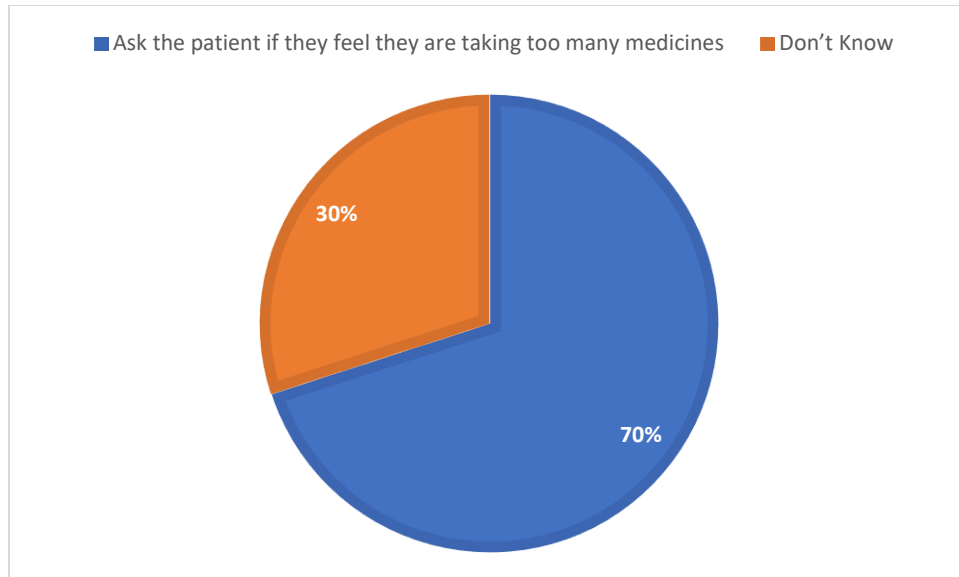
### 5.7. Treated



**Fig 09: Treated**

According to this survey, 60% people polypharmacy can treated. 40% people think its can't.

### 5.8. Test for polypharmacy

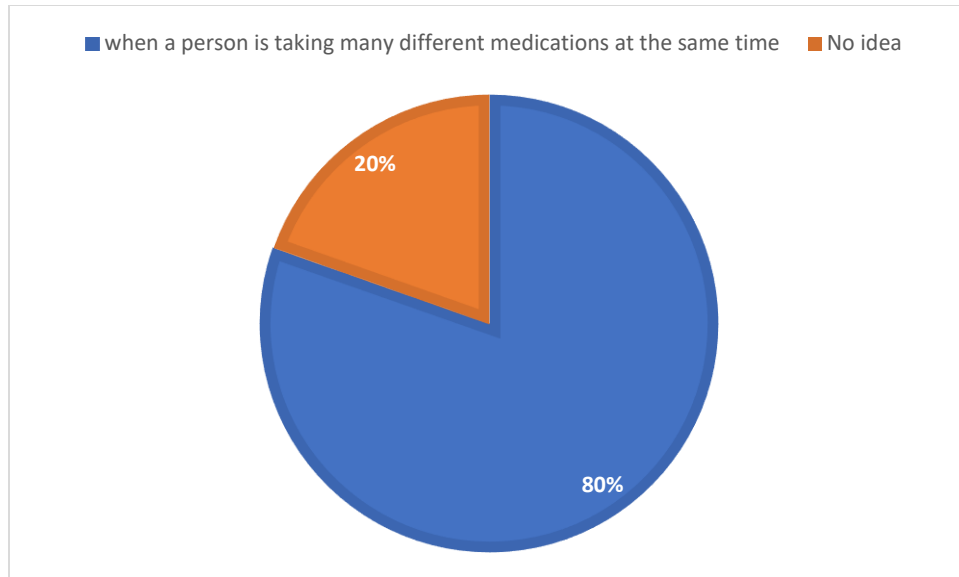


**Fig 10: Test for polypharmacy**

According to this survey, 70% people think ask the patient if they feel they are taking too many medicines is the test for polypharmacy. 30% people have no idea about this.



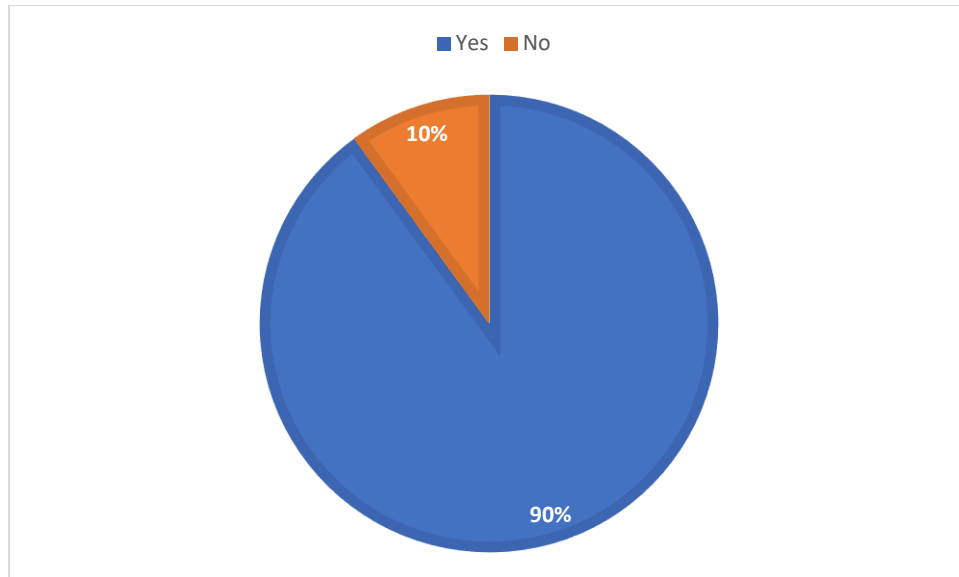
### 5.9. Example of Polypharmacy



**Fig 11: Example of polypharmacy**

In this survey, 80% people think, a person taking too many different medications at a same time is called polypharmacy.20% people have no idea about this.

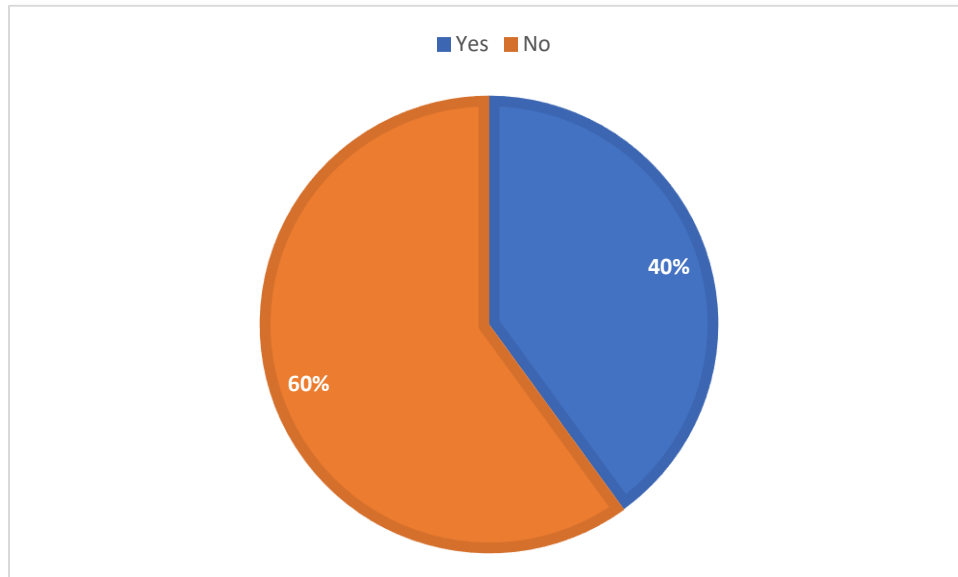
**5.10. knowledge about any drug-drug or drug-disease interactions**



**Fig 12: knowledge about any drug-drug or drug-disease interactions**

In this survey, 90% people have knowledge about drug-drug or drug diseases interaction. 10% people have no idea about this.

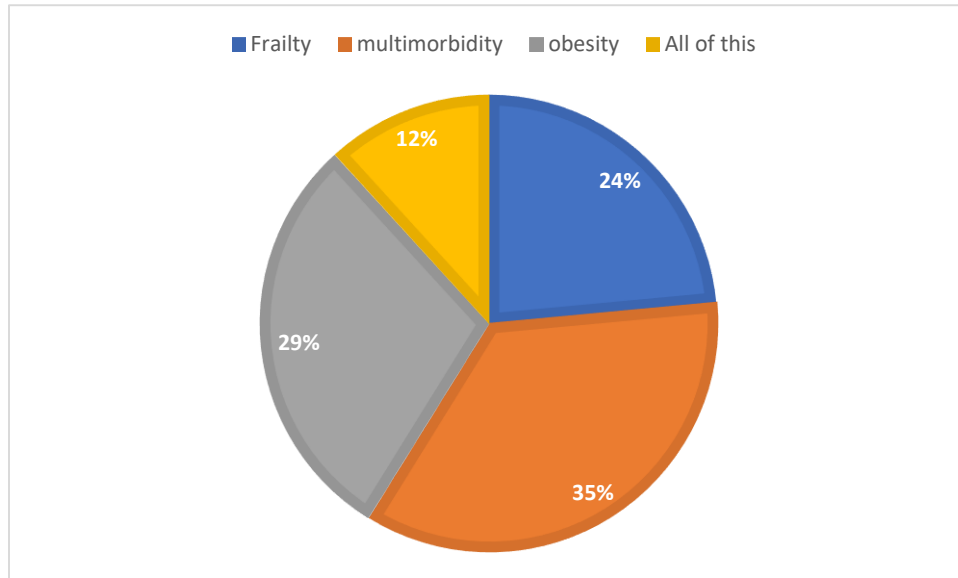
**5.11. knowledge about Risk of DDI of polypharmacy in patients with chronic disease**



**Fig 13: knowledge about Risk of DDI of polypharmacy in patients with chronic disease**

In this survey around 60% respondents has no idea about Risk of DDI of polypharmacy in patients with chronic disease and 40% has no idea about this.

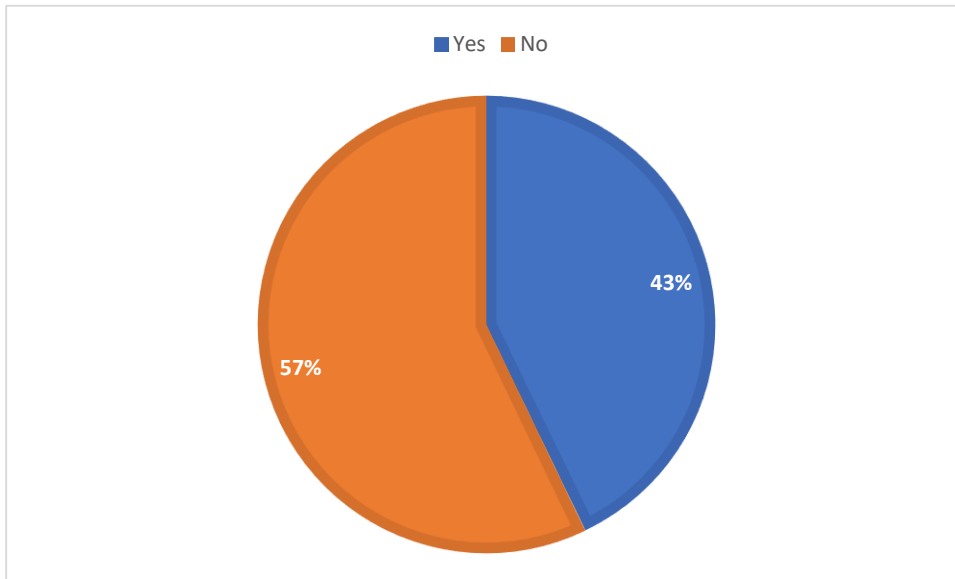
### 5.12. Factors contribute to polypharmacy in the elderly



**Fig 14: Factors contribute to polypharmacy in the elderly**

According to this survey around 35% respondents said multimorbidity contribute to polypharmacy in the elderly, 24% respondents said fertility contribute to polypharmacy elderly, 29% said obesity and 12 % said all of this contribute to polypharmacy in elderly.

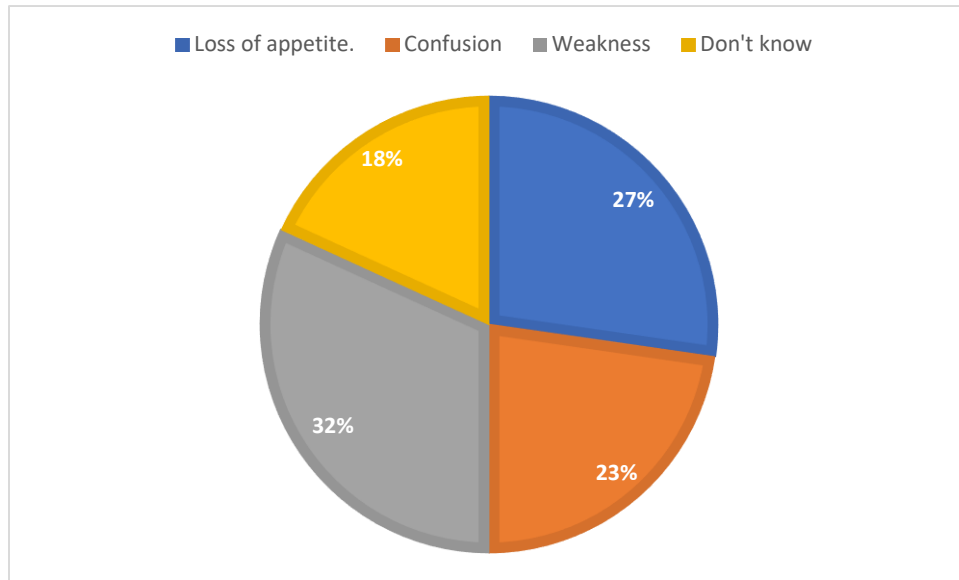
### 5.13. Idea about OTC drug



**Fig 15: Idea about OTC drug**

In this survey around 43% respondents has idea about over the counter drug (OTC) and 57% respondents has no idea about OTC drug

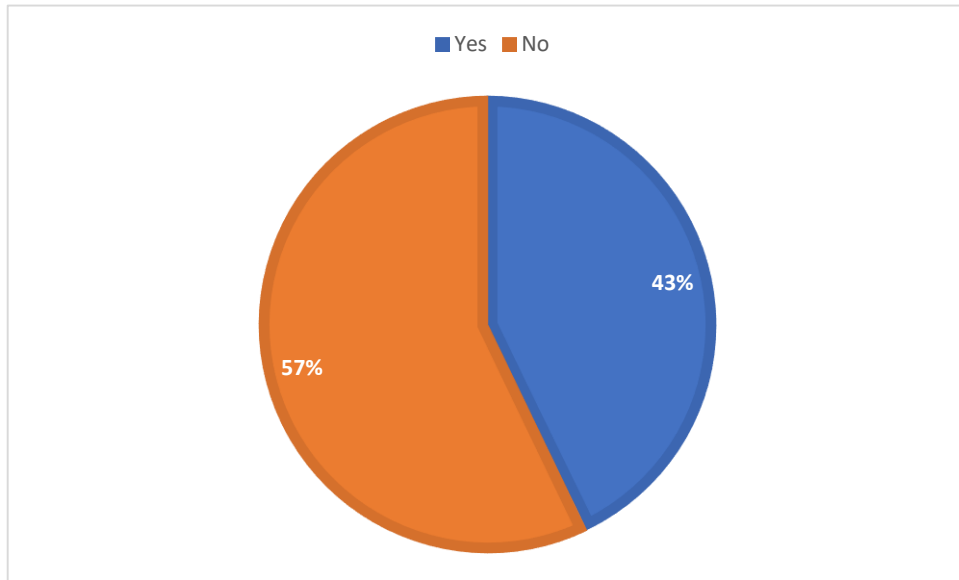
### 5.14. Possible symptoms of polypharmacy



**Fig 16: Possible symptoms of polypharmacy**

In this survey around 32% respondents said weakness is reason of polypharmacy, 27% respondents said loss of appetite, 23% respondents said confusion happened, 18% respondents have no idea about Possible symptoms of polypharmacy.

**5.15. Use of drug to reduce the side effect of another drug**



**Fig 17: Use of drug to reduce the side effect of another drug**

In this survey around 57% respondents has no idea Use of drug to reduce the side effect of another drug and 43% respondents has idea about this.

# Conclusion



## Survey on Polypharmacy

Polypharmacy is associated with a wide variety of adverse effects. The rising prevalence of the use of many drugs has been linked to a rise in the expenditures of medical treatment as well as an elevated risk of adverse drug responses, drug-drug interactions, medication noncompliance, and several geriatric syndromes. Reducing the incidence of polypharmacy, ensuring patient safety, lowering the number of hospitalizations required, and lowering the costs associated with these activities can be accomplished by conducting medication reconciliations during care transitions, removing duplicate medications, assessing for drug-drug interactions, and reviewing dosages are the solution of polypharmacy.

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